

## United States Patent [19]

Watanabe et al.

[11] Patent Number:

5,914,548

[45] Date of Patent:

Jun. 22, 1999

[54]	SEALED ACTUATOR
[75]	Inventors: Hayao Watanabe; Atsushi Horikoshi, both of Gunma, Japan
[73]	Assignee: NSK Ltd., Tokyo, Japan
[21]	Appl. No.: 08/773,180
[22]	Filed: Dec. 27, 1996
[30]	Foreign Application Priority Data
	. 28, 1995 [JP] Japan
[51]	Int. Cl. <sup>6</sup> H02K 5/10; H02K 11/00; H02K 7/20
[52]	U.S. Cl
[58]	Field of Search

5,446,966	9/1995	Ishizaki 318/605
5,469,035	11/1995	Lowrance 318/568.1
5,641,276	6/1997	Heidelberg et al 417/423.7
EO	DELCAL	DATES III DOOLIS (ENERG

#### FOREIGN PATENT DOCUMENTS

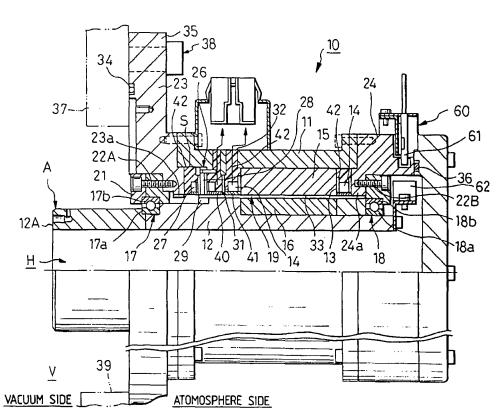
3-150041	6/1991	Japan	H02K 5/12
3-150042	6/1991	Japan	H02K 5/12
WO 94/23911	10/1994	WIPO	B25J 21/00

Primary Examiner—Clayton LaBalle Attorney, Agent, or Firm—Sughrue, Mion, Zinn, Macpeak & Seas, PLLC

#### [57] ABSTRACT

A sealed actuator includes a motor stator having rotation-drive magnetic poles; a motor rotor arranged so as to confront magnetic pole surfaces of the motor stator while interposing a small distance therebetween and rotatably supported through roller bearings; and displacement detecting means for measuring displacement of the motor rotor. A partition wall made of a nonmagnetic metal is disposed in a clearance between the motor stator and the motor rotor, so that the inner space where the motor stator is disposed is hermetically covered. The bearings are disposed at both sides of the partition wall in the axial direction so that the load applied to the bearings are directly received by a housing. At least a part of the partition wall is reinforced by reinforcing members and a mold agent is charged into the space on the motor stator side.

### 24 Claims, 7 Drawing Sheets



[56]

# References Cited U.S. PATENT DOCUMENTS

2,809,310 10 2,993,131 3,686,556 8 4,893,078 15,270,600 12 5,291,087 3	0/1957 Dur 7/1961 Tre 8/1972 Ang 1/1990 Aug 2/1993 Has 3/1994 Pol	nes 310/40 n et al. 310/86 vitt 310/86 ger et al. 318/595 hterlonie 318/660 himoto 310/86 i 310/88
---	--	--